In the Claims:

1. (Previously Presented) A method for forming a capacitor of a semiconductor device, comprising the steps of:

(a) forming an oxide film on an interlayer insulating film having a storage electrode contact plug;

(b) selectively etching the oxide film to form an opening exposing the top surface of the storage electrode contact plug;

(c) forming a polysilicon layer on the bottom and the inner walls of the opening;

(d) removing the oxide film to form a polysilicon storage electrode;

(e) forming a dielectric film having a stacked structure of Al-rich HfO_2-Al_2O_3 film and Hf-rich HfO_2-Al_2O_3 film on the surface of the polysilicon storage electrode;

(f) annealing the dielectric film; and

(g) forming a plate electrode on the dielectric film.

2. (Original) The method of claim 1, further comprising the step of cleaning the surface of the storage electrode with a cleaning solution of $NH_4OH : H_2O_2 : H_2= 1 : (4 \sim 5) : (20 \sim 50)$ after the step (d) to form an oxide film having a thickness ranging from 3 to 5Å on a surface of the storage electrode.

3. (Original) The method of claim 1, further comprising the step of cleaning the surface of the storage electrode with an HF or BOE solution and performing an RTO process after the step (d) to form an oxide film having a thickness ranging from 8 to 15Å.

4. (Original) The method of claim 1, wherein the step (e) is performed in an ALD process and the thickness of the Al-rich HfO_2-Al_2O_3 film and the Hf-rich HfO_2-Al_2O_3 film is 5 to 30Å and 10 to 100Å, respectively.

5. (Previously Presented) The method of claim 1, wherein the step (e) is performed in an ALD process using $Al(CH_3)_3$ as an Al source, $HfCl_4$ as an Hf source and H_2O, O_3, O_2 and N_2O as an O source, one cycle for Al_2O_3 ALD process comprising Al pulse, N_2 purge, O pulse and N_2 purge, and one cycle of HfO_2 of the ALD process comprising Hf pulse, N_2 purge, O pulse and N_2 purge processes.

6. (Original) The method of claim 1, wherein the step (e) is an ALD or CVD process performed at a temperature of 150 to 600°C.

7. (Previously Presented) The method of claim 1, wherein the step (e) is an ALD process using a Hf source selected from the group consisting of $HfCl_4$, $Hf[N(C_2H_5)_2]_4$, $Hf[N(CH_3)_2]_4$, $Hf[N(CH_3)(C_2H_5)]_4$, $Hf[OC(CH_3)_3]_4$, $Hf(NO_3)_4$, and combinations thereof, and an O source selected from the group consisting of H_2O, O_2, N_2O, O_3, and combinations thereof, one cycle of HfO_2 of the ALD process comprising Hf pulse, N_2 purge, O pulse and N_2 purge in.

8. (Original) The method of claim 1, wherein a ratio of HfO_2 : Al_2O_3 in the Al-rich HfO_2-Al_2O_3 film ranges from (1 cycle: 1 cycle) ~ (9 cycle: 1 cycle).

9. (Original) The method of claim 1, wherein a ratio of HfO_2 : Al_2O_3 in the Hf-rich HfO_2-Al_2O_3 film ranges from (9 cycle: 1 cycle) ~ (2 cycle: 1 cycle).

10. (Original) The method of claim 1, wherein the step (f) is performed at a temperature ranges from 500 to 900°C under oxygen or nitrogen gas atmosphere for 1 to 10 minutes.

11. (Original) The method of claim 1, wherein the step (f) is performed in a furnace at a temperature ranges from 500 to 900°C under oxygen, nitrogen or N_2O gas atmosphere for 10 to 60 minutes.

12. (Original) The method of claim 1, wherein the step (g) is a CVD process for forming the plate electrode using a material selected from the group consisting of TaN, TiN, WN, W, Pt, Ru, Ir, doped polysilicon, and combinations thereof.

13. (Previously Presented) A method for forming a capacitor of a semiconductor device, comprising the steps of:

(a) forming an oxide film on an interlayer insulating film having a storage electrode contact plug;

(b) selectively etching the oxide film to form an opening exposing the top surface of the storage electrode contact plug;

(c) forming a polysilicon layer on the bottom and the inner walls of the opening;

(d) removing the oxide film to form a polysilicon storage electrode;

(e) forming a dielectric film using Al-rich HfO_2-Al_2O_3 film on the surface of the polysilicon storage electrode;

(f) annealing the dielectric film; and

(g) forming a plate electrode on the dielectric film.

14. (Previously Presented) A method for forming a capacitor of a semiconductor device, comprising the steps of:

(a) forming an oxide film on an interlayer insulating film having a storage electrode contact plug;

(b) selectively etching the oxide film to form an opening exposing the top surface of the storage electrode contact plug;

(c) forming a polysilicon layer on the bottom and the inner walls of the opening;

(d) removing the oxide film to form a polysilicon storage electrode;

(e) forming a dielectric film having a stacked structure of Al_2O_3 film and Hf-rich HfO_2-Al_2O_3 film on the surface of the polysilicon storage electrode;

(f) annealing the dielectric film; and

(g) forming a plate electrode on the dielectric film.